Internet Protocol Suite Enhanced for Satellite-Based Networks

Research conducted by the Satellite Networks and Architectures Branch of the NASA Glenn Research Center at Lewis Field as well as by GTE Internetworking has increased the performance of the standard Internet protocol efficiency over long-delay satellite channels (ref. 1). These protocol extensions will enable efficient operation of standard off-the-shelf networking software in NASA's network of space-based assets (e.g., the International Space Station and data-gathering satellites).

The work at Glenn focused on two areas. The first was the startup phase of a transfer between two computers. This period in a transfer has been shown to use the available network resources inefficiently. We experimented with several ways to improve the network utilization during this period (refs. 2 and 3). The second area was making the protocols estimate the available bandwidth of the network path so that the transfer could make better use of the available resources (ref. 4). These studies have shown that transfer times improve when the mechanisms developed at Glenn are used. Finally, Glenn funded GTE Internetworking to incorporate a "pacing" algorithm into the standard Internet protocols. This protocol extension provides high performance over a long-delay-based network, while minimizing the impact of these transfers on protocols were used instead of the standard protocols.

References

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General information about NASA Glenn's Internet protocol research http://ctd.grc.nasa.gov/5610/5610.html.

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